

2011 TNO search fields

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Field definition outline

- Choose sample of objects
- Compute distribution of positions at time T that correspond to time of new moon each month (5/3, 6/1, 7/1, 7/30, 8/28, and 9/27)
- Choose field centers for Subaru and Magellan that cover 80% of sample.
- Overlap tuned to each camera, controlled by sample coverage
- Field constraints, no dithering, field positions fixed within lunation

Adopted spacecraft parameters

- Radial velocity at Pluto encounter 13.8 km/sec
- Pluto encountered at distance $r = 32.9$ AU
- S/C $\Delta V \leq 115$ m/sec

Object sample

- Start with known CLASSICAL and SCATEXTD (DES system) TNOs
 - “Natural” dynamical distribution of objects requiring no model (based on 495 real objects)
- Keep a, e, i for each object.
- Generate 500 clones with random Ω and ω chosen from a uniform distribution $[0, 2\pi)$
- Find value(s) of M that puts clones in S/C cone
- Pick a one random M per clone
- Save object elements

Subaru SuprimeCAM parameters

- FOV 2040 x 1620 arcsec (e/w, n/s)
- Overlap 90 x 90 arcsec
- 12-image pattern (3 x 4)


Magellan MegaCAM parameters

- FOV 1500 x 1500 arcsec
- Overlap 30 x 30 arcsec
- 16-image pattern (4 x 4)

Sky-plane distribution at time T

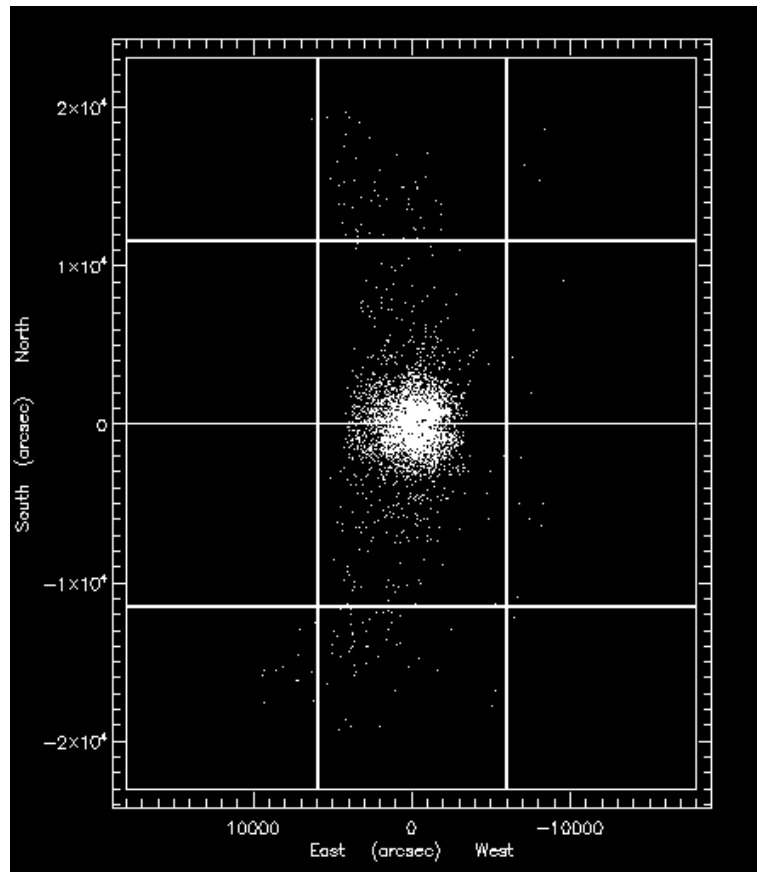
- Compute sky-plane position at T
- Compute mean position of all objects \rightarrow this is the tangent plane (pattern center) coordinate
- Convert object positions to tangent plane (ξ, η)
- Given pattern specs, compute sample coverage
- Adjust pattern to get coverage desired
 - Offset from mean (0 chosen)
 - Number of fields
 - overlap

Sample coverage

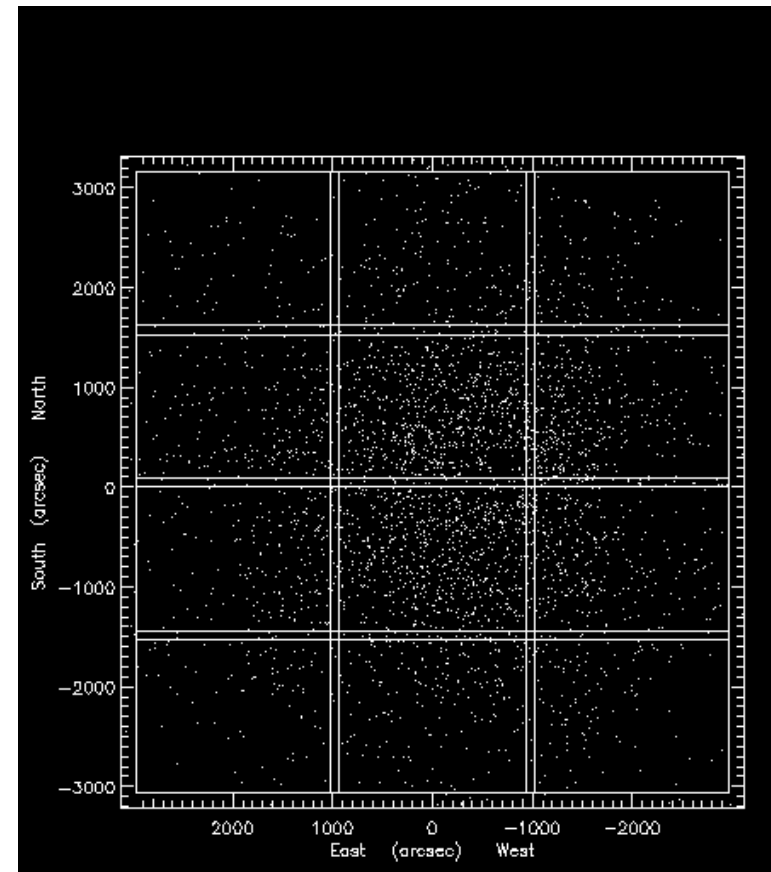
pattern	all	classical	Area (deg^2)
1x1	22.3%	24.0%	0.26
1x2	37.2%	40.0%	0.50
2x1	34.2%	36.7%	0.50
2x2	57.5%	61.8%	0.97
2x3	69.6%	74.8%	1.44
3x2	64.3%	69.0%	1.44
3x3	78.6%	84.4%	2.15
 3x4	84.8%	91.0%	2.85
4x5	90.2%	96.7%	5.64
5x6	91.9%	98.1%	7.04

Total number of objects is 4042, of which 3763 are classical TNOs.
This pattern is for SuprimeCAM and 3x4 is the preferred pattern
from this analysis.

SuprimeCAM coverage



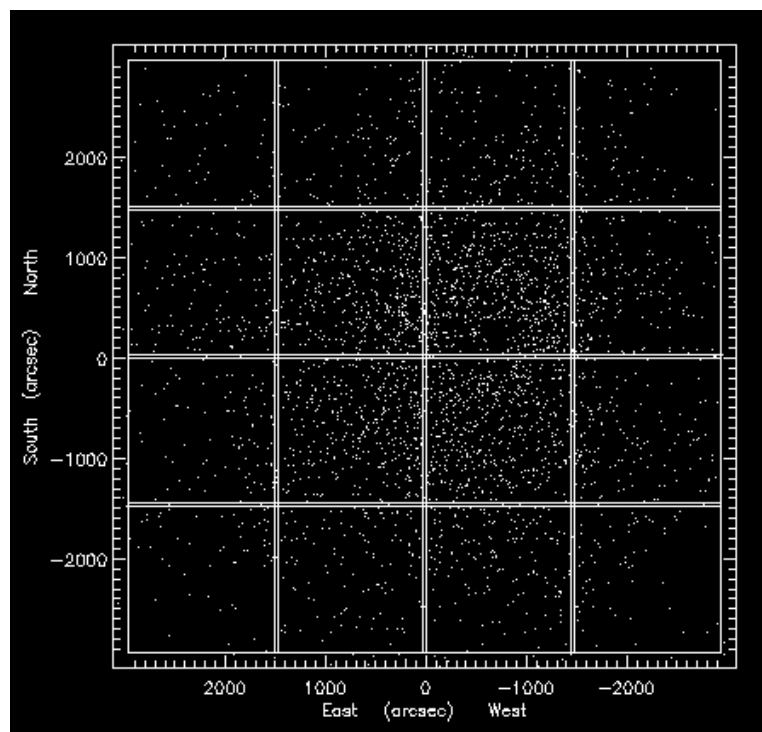
All objects



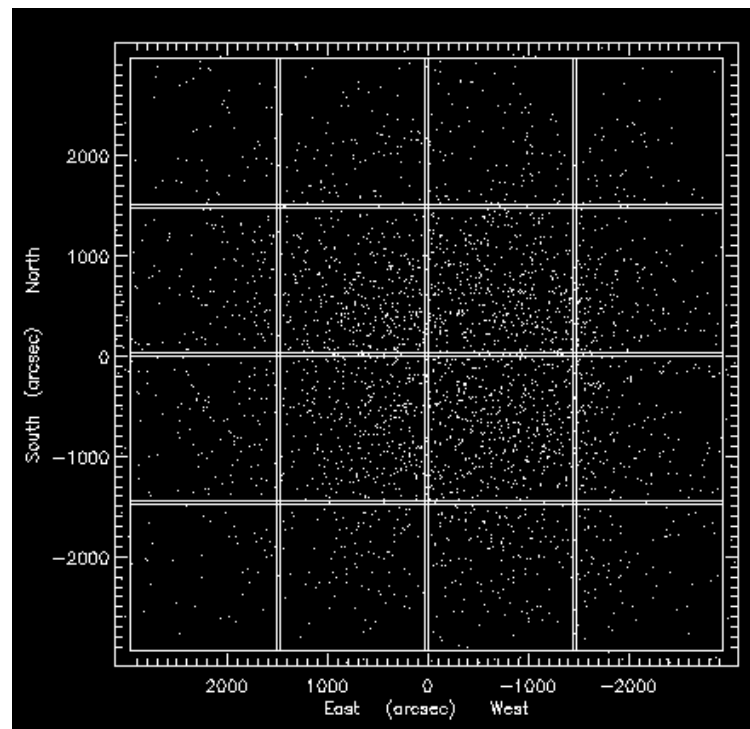
3x4 pattern
classical only

2011-06-01

Magellan MegaCAM coverage



4x4 pattern
classical only
90% coverage
2011-06-01



4x4 pattern
classical only
88% coverage
2011-09-27

Monthly pattern centers

- 2011-05-03 18:32:47.9 -21:17:09
- 2011-06-01 18:31:09.4 -21:16:37
- 2011-07-01 18:28:50.4 -21:17:19
- 2011-07-30 18:26:30.7 -21:18:57
- 2011-08-28 18:25:03.6 -21:19:58
- 2011-09-27 18:24:40.8 -21:20:51
- Pattern center computed from object distribution at 0^h UT on date listed.

2011-06-01 SuprimeCAM field centers (J2000)

Field #	α	δ
0	18:28:49.3	-21:54:04
1	18:31:09.4	-21:54:07
2	18:33:29.5	-21:54:04
3	18:28:49.7	-21:28:34
4	18:31:09.4	-21:28:37
5	18:33:29.1	-21:28:34
6	18:28:50.1	-21:03:04
7	18:31:09.4	-21:03:07
8	18:33:28.7	-21:03:04
9	18:28:50.5	-20:37:34
10	18:31:09.4	-20:37:37
11	18:33:28.3	-20:37:34